Re: Gasco Segment 2 Capture Zone Field Test Report

Sean Sheldrake to: John Edwards 04/25/2011 05:25 PM

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John, Bob,

The following are EPA comments on the *Segment 2 Capture Zone Field Test Report, Gasco Sediments Site* document dated March 2011 prepared by Anchor QEA, LLC for NW Natural. EPA understands that the purpose of the document is to present a summary of the results and findings for the capture zone field testing performed in 2010. EPA has the following general comments related to this document.

General Comments

1. NW Natural should elaborate on how the results from the Segment 2 capture zone testing will be integrated into future numerical groundwater modeling studies.

2. NW Natural should set a more definitive threshold to define potential capture in Table 3. For instance a head difference of 0.5 feet or greater is fairly definitive, but if smaller, it becomes questionable if the gradient reversal is attributable to pumping or a natural influence related to seasonal river stage and groundwater heads.

EPA has the following specific comments related to this document.

Specific Comments

1. Section 1.0, page 1, paragraph 3: NW Natural states in the first sentence that studies conclude shoreline extraction wells will control groundwater discharge from the Gasco Sediments Site into the river, but the second sentence states, “Shoreline groundwater containment will also reduce groundwater discharge from the sediment mudline into the river channel within an area of the riverbed near the Gasco Sediments Site.” NW Natural should explain the distinction between controlling groundwater discharge and reducing groundwater discharge within the area of riverbed near the Gasco Sediments Site.

2. Section 2.3.1, page 5, paragraph 3: NW Natural should present the specific capacities of the wells determined from the various pumping test rates (preferably in table format). It is also important that NW Natural expand on the analysis and discussion of each well’s capacity to meet the range of required pumping rate

discharges to meet groundwater capture at target wells.

Understanding the well capacity limitations helps deal with potential problems proactively, rather than reactively, thereby limiting periods of inadvertent well shutdown due to pumping capacity problems and risk of potential recontamination of the in-water sediment cleanup areas. Furthermore, this analysis and information can be used to inform design of wells for other capture zone segment areas to provide more efficient and effective capture. If the well efficiency and sustainable capacities are not addressed up front, then a robust performance monitoring plan will be critical in managing this reactive method of monitoring and addressing well capacity issues in an effective and timely manner.

3. Section 3, pages 8 and 9, paragraphs 4-7: The Serfes method appears to be sufficient in understanding and quantifying the influence and relationship between diurnal tidal river stage flux and the groundwater heads of the fill and alluvium units during test periods. However, this analysis does not address the relationship between longer-term seasonal river stages and groundwater heads in aquifer zones. Based on a review of capture zone test data, this relationship is significant and should be evaluated by NW Natural, as it appears some of the influence being attributed to pumping, may in fact be due to a natural relationship between river stage and groundwater heads.

   For example, EPA reviewed the results of two very similar 72-hour tests conducted by NW Natural in late April 2010 and in early November 2010. Both tests had the pumping wells (PW-7-93, PW-8-39, and PW9-92) pumping at a rate of 25 gallons per minute (gpm) and both test results were analyzed using the Serfes method [A minor exception was that during the November 2010 test an additional shallow well (PW-8-39), completed in the fill, was pumping at 2 gpm.] . Despite these similarities, the capture assigned to the pumping was generally greater and influenced more wells during the April test than during the November test (see Table 3 in the Capture Zone Field Test Report). A key difference between the two tests was the seasonal stage of the Willamette River, which during the April test was 1.89 feet higher than during the November test.

   The significance of this seasonal variability between two similar tests indicates some quantifiable difference between river stage and groundwater heads (presented in the report as the delta) might be incorrectly assigned and attributed as capture/influence from pumping wells. Instead a portion, or the entire quantified delta may be due to seasonal changes in flux between the river and the alluvial aquifer. This means at certain times of the year, the river presents a bank recharge effect and the gradients between river stage and groundwater heads are reversed naturally. Based on a review of the 23-year U.S. Geological Survey (USGS) Willamette River stage record at Portland [USGS Station 14211720 Willamette River at Portland, OR, Monthly Mean Gage Height – 1987-2010

Link:
http://waterdata.usgs.gov/nwis/monthly?referred_module=sw&site_no=14211720&por_14211720_3=546878,00065,3,1987-10,2010-12&format=html_table&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list], the lowest stage typically occurs in September and it is an additional 2 feet lower than the typical November stage. EPA suggests that NW Natural evaluate this seasonal stage influence and relationship between river and local alluvium groundwater heads to understand and better quantify what is actual pumping influence and not

seasonal bank recharge influence.

4. Section 4.1, page 10, paragraph 2, last sentence: NW Natural should provide the analysis and the methodology, or explain how hydraulic conductivity was derived from the 2010 pumping test of Segment 2 pilot well PW8-39.

5. Section 4.1, page 10, paragraph 3, second and last sentences: NW Natural should expand on their test findings that the Segment 2 capture zone tests were inadvertently conducted in an area not representative of the upper alluvium and provide sufficient information to support this statement. Additional testing in the upper alluvium of the other segments, similar to what was conducted in Segment 2, may be necessary to provide sufficient information to support this hypothesis.

6. Section 4.1, page 10, paragraph 4, first sentence: NW natural should define the term “high degree” used in the context of this sentence. Based on review of the hydraulic capture data (Table 3), the quantified gradient reduction appears very small, with the exception of the pumping wells, which have significant drawdown as a result of well loss effects.

7. Section 4.1, page 10, paragraph 4: NW Natural should present additional information and analysis to support their belief that “complete containment” can be achieved by varying extraction well pumping rates to counterbalance the effect of river tidal fluctuations and seasonal river stage fluctuations. This information would evaluate, on an analytical basis, the sustainable pumping rates of each well based on their available drawdown, specific capacities, and pumping rates necessary to achieve drawdown at during seasonal extremes. This evaluation should include the month of September when groundwater heads are low resulting in less available drawdown and river stages are even lower, requiring higher pumping rates. These conditions do not appear to have been evaluated in any of the existing long-term alluvial aquifer pumping tests.

Please submit requested information and a response to comments within 30 days.

Thank you.

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Deliveries: Parking Garage mailroom (1st floor)
Visitors: Check-in @ PERC / Service Center on 12th floor:
http://yosemite.epa.gov/r10/extaff.nsf/Homepage/**Visiting+Seattle**

John Edwards	Good Afternoon Sean. Attached is a PDF of the...	03/14/2011 02:30:54 PM

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Date:	03/14/2011 02:30 PM
Subject:	Gasco Segment 2 Capture Zone Field Test Report

Good Afternoon Sean.

Attached is a PDF of the Gasco Segment 2 Capture Zone Field Test report Text, Tables, Figures, and data validation report. The file size of the combined appendices is too large to send via e-mail. So we are preparing a CD containing a PDF that is formatted to meet EPA requirements and you should have it Wednesday.

John

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